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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

December 4, 1937

Rime

See Page 360

A SCIENCE SERVICE PUBLICATION

Do You Know?

The average passenger automobile uses over 600 gallons of gasoline in a year.

California Indians burned pinon nuts to obtain blue coloring with which they tattooed their faces.

A Chinese emperor, who established a zoo near Peking about 1100 B. C., called it an Intelligence Park.

Fish cannot exist in absolutely pure water, but that doesn't worry the fish because in no stream does such water exist.

Pointing out that Indian speech was not crude, a California anthropologist says that the average Indian of southern California had a vocabulary of about 3,500 words.

Baseball players are apt to be at top form at 28 years, golf players from 25 to 35, bowlers 30 to 34, says a psychologist, who has checked up on best ages for various sports.

The plant for which Hollywood, California, was named is the California Christmas berry, sometimes called California holly, which once grew thick in that neighborhood.

According to a Detroit psychologist, some of the wild and reckless automobile driving is done by motorists who are not very successful in other endeavors, and who get satisfaction out of fancied traffic victories.

Male kangaroos keep on growing as long as they live.

The bulk of the world's oil supply comes from wells that no longer "gush."

Mount Pavlof, active volcano of Alaska, is twice the height of its famous cousin Vesuvius.

Use of squared timbers in coal mines is advocated by a state inspector, who points out that round timbers roll, and in other ways may cause accidents.

Spanish moss, used as filling for upholstered furniture and mattresses, yields Louisiana an income of one and one-half to three million dollars annually.

Fragile looking butterflies called "Painted Ladies" fly all the way to England from North Africa, over a thousand miles.

A new process is said to give concrete a glazed surface, making it suitable for walls, table tops or other uses where tiling is ordinarily employed.

Few plants can live in water hotter than 100 degrees Fahrenheit, and about 200 degrees is the greatest heat at which plants have been observed.

France is taking steps to safeguard its drinking water supplies, and the latest development is a reservoir at Nantes, pronounced the biggest in Europe.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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SCIENCE NEWS LETTER

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GENERAL SCIENCE

American Found Antarctica, Philosophical Society Is Told

American Mariner Only Twenty Years Old Made Find On Sealing Voyage; Greek Coins Reveal Trade Upset

THE LOG book of Captain Nathaniel Brown Palmer of Stonington, Conn., adventurous early nineteenth century American mariner, was offered to the American Philosophical Society as proof that Capt. Palmer and his shipmates were the first ones to set eyes on Antarctica.

Found by Col. Lawrence Martin, chief of the Division of Maps of the Library of Congress, in the possession of Capt. Palmer's descendants, who still live in Stonington, the log book constitutes the first direct proof that the Yankee skipper was the discoverer of the great white continent to the south, Society members were informed.

A new chapter in an old geographical dispute between the United States and Great Britain has been written as a result of the find, the Society has learned.

Immediately after Col. Martin presented his report describing the find, Prof. William H. Hobbs of the University of Michigan took issue with British authorities for continuing to call the land found by Palmer "Graham Land" to honor a British mariner who sailed along its coast a dozen years after the American.

A fascinating story of high adventure in the icy seas below the tip of South America and of international rivalry was told by the two men in their respective papers.

Seven Ships

Capt. Palmer commanded one of a fleet of seven sealers that left Stonington, a famous port of another day, on Aug. 31, 1820, to hunt seal in the Antarctic. Two months later six of the ships laid over in President Harbor in the South Shetland Islands to prepare for sealing while Palmer was sent out to locate a better harbor.

It was on November 17, 1820, that Capt. Palmer in his 44-ton ship, the "Hero," sighted the peninsula that juts out of Antarctica toward South America and is called by geographers today "the American Salient." Capt. Palmer's name was given to the land, but subsequently British mapmakers persisted in naming most of it and eventually in referring to all of it as "Graham Land."

Capt. Palmer has been generally credited with finding the great white wastes to the south of South America, but the evidence until now has been purely circumstantial. Interviewed by Science Service, Col. Martin related that he found the logbook on a trip to Stonington in search of old papers. A specialist in maps and charts, he was looking mainly for old maps when he stumbled across the logbook, a much more valuable find. He had been visiting one after the other descendants of old seafaring families in the hope that they would have maps of interest to the historian.

Cruised For Week

Capt. Palmer, who was a mere stripling of twenty when he made his discovery, sailed along the coast for a week. The stretch of land he found was thought for many years to be a peninsula and it is believed to be that today. However, a few years ago Sir Hubert Wilkins, in his flights across the southern ice camp, reported that it looked like an island to him.

"Lightning" in Tube

An electrical discharge in a tube filled with gas behaves like a stroke of lightning, Prof. J. W. Beams of the University of Virginia and Dr. L. B. Snoddy reported to the Society.

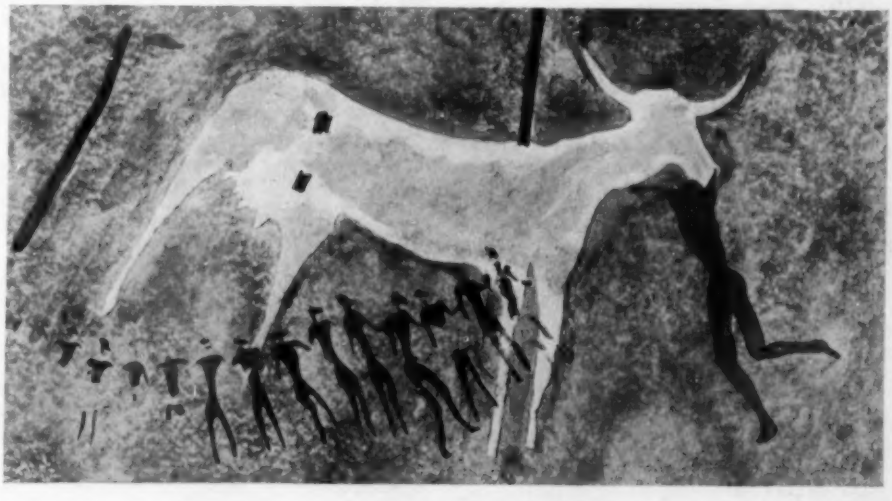
Studying the speed with which luminosity traveled in a long discharge tube, the two researchers found a discharge that appeared to correspond to the "leader stroke" of lightning and a return discharge that was similar to the return stroke of a flash of lightning.

Short On Tin

Greek coins, short on tin, reveal an ancient trade upset that happened when mighty Carthage was destroyed, Dr. Earle R. Caley, Princeton University chemist, informed the American Philosophical Society meeting in Philadelphia.

Predicting that modern pennies—now 95 per cent. copper and five per cent. tin and zinc—may be changed chemically, recording another historic shortage of the important metal tin, Dr. Caley said:

"It seems likely that, at the present rate of tin comsumption, the time will



HONOR TO THE COW

Antiquity and wide distribution of the cult of the sacred cow is attested by this rock painting, probably of Stone Age date, found in what is now arid country in Lybia, North Africa. It shows a circle of devotees dancing around behind a huge figure of a white cow. (The larger figure without a head is probably not a part of this painting but of another group near by.) This picture, shown at an Art of Early Man exhibition of the Academy of Natural Sciences of Philadelphia, was supplied by the Museum of Modern Art, New York.

come again when coinage of bronze will cease."

Dr. Caley, in charge of the chemical laboratory at the Athenian Market Place —the first chemical laboratory ever set up at a Greek archaeological site—told of detecting a sudden change in bronze coins about the middle of the second century B. C. Apparently the tin supply was cut off, and coins were then made from scrap bronze which could be used in coinage by melting it with lead.

The coins shed light on economic history, Dr. Caley reported, by showing that long before Caesar's military campaigns in Europe cut off Britain's overland exports of tin to the Mediterranean, the tin trade was apparently halted on the seas by the destruction of Carthage in 146 B. C. That defeat ended the famous sea trade in tin, by which the Phoenicians and their later brethren the Carthaginians supplied the civilized world with this metal from Britain.

Rome's imperial coinage also reflected this scarcity of tin, Dr. Caley has found. From about the beginning of the Christian era, Rome's minor coins were of pure copper, or copper-zinc alloy. The tin-copper alloy, called bronze, disappeared as coin material in ancient times, not to be resumed to any extent until the United States and European countries revived bronze coins about the middle of the past century.

African Women Gangs

African women gang together to safeguard "women's rights" and they meet in secret society—no men allowed.

So an American expedition has found, studying the little-known Sherbro people of Sierra Leone, in British West Africa.

Both men and women of this tribe have their secret societies, from which the opposite sex is rigidly excluded, H. U. Hall told the American Philosophical Society in reporting a study of customs sponsored by the Society and the University Museum, University of Pennsylvania.

Until British authority became effective in southern Sierra Leone, the men's secret society held even more power than the native chieftains, especially in maintaining law and order. It is still powerful and flourishing, Mr. Hall said. Not to be a "Poro" man, as the society is called, is not to be a man at all, in Sherbro opinion.

"The counterpart of the Poro, for Sherbro women," said Mr. Hall,, "is the Bondo Society. It is the champion of women's rights and privileges. Novices are instructed in these and in the duties of womanhood during a period of seclusion in the Bondo Bush, or grove, similar to that undergone by Poro initiants in their Bush."

Creates Dual Personality

Dual personality has been created experimentally in the psychological laboratory at the University of Illinois, by the use of the South American arrow poison, curare, Dr. E. A. Culler told the meeting.

Actions learned in one personality are forgotten during life in the other personality, he said. Dogs were the subjects of this Jekyll-Hyde experiment; the drug, by depressing the brain caused the animals to act on a different level of the nervous system.

Normally, learning takes place in the cortex of the brain, but when the brain is affected by a powerful drug such as curare, learning can take place at a lower level involving, presumably, subcortical parts of the nervous system.

But what is learned during the normal personality is forgotten under the influence of curare. What is learned during the curare personality, when the animal is functioning at the lower level, is similarly forgotten when he returns to his normal personality.

Eggs Without Nuclei

Eggs of lower animals can develop without nuclei, either their own or those normally received from the sperm cells in fertilization, stated Dr. Ethel Browne Harvey, who worked on the problem at Woods Hole, Mass., and Naples, Italy, under a grant from the American Philosophical Society.

Dr. Harvey whirled sea urchin eggs in a centrifuge, subjecting them to a force 10,000 times gravity. This whirled the eggs in two, with the nuclei in the lighter halves. Then she applied chemicals and physical stimuli to the parts without nuclei, which caused the cells to divide and start development.

Division and arrangement of parts went on as though the cells were normally nucleated, until there were about 500 of them in the group and they had reached a definite early stage in organic development known as the blastula stage. These rudimentary organisms without nuclei lived in some cases as long as four weeks, whereas normal unfertilized sea-urchin eggs commonly die in a day or two.

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DOCUMENTATION

Page Selector for Bibliofilm Reading Apparatus Patented

AN AUTOMATIC page selector for users of bibliofilm reading machines (for reading books and documents recorded on motion picture film) was patented by Dr. Rupert H. Draeger, U. S. naval surgeon now on his way to join the Asiatic fleet.

The device, which stops the electrically driven projector for the film on which documents are recorded when a predetermined page has been reached, is one of a large number of microfilm appliances developed by Dr. Draeger at the instance of the Documentation Division of Science Service, the non-profit institution for the popularization of science.

Patent No. 2,099,682 covers the apparatus. Funds of the Chemical Foundation aided Dr. Draeger in his experimental work.

Object of the microfilm service, sponsored by the American Documentation Institute, is the recording on tiny photographic film bulky document files. The page selector is a part of the special projector required to read documents so recorded.

The machine, which takes advantage of the fact that motion picture film, with perforations along its edges, is used for recording the books, uses an electric motor and a variation of a standard counting device to stop the film strip when the proper page has been reached.

Science News Letter, December 4, 1937

GENERAL SCIENCE

Science's Impact on Society To Be Studied by A. A. A. S.

A TWO-YEAR plan for discussing the impact of science upon human beings, both as members of society and as individuals, was announced by Dr. F. R. Moulton, permanent secretary of the American Association for the Advancement of Science.

The fundamental resources of the world in which we live will be explored in extensive conferences during A.A.A.S. meetings the last week in December at Indianapolis. Agriculture, minerals, forests, power, capital, man power and its use, scientific methods in business, research laboratories and economic development factors will be covered by special papers by experts.

Subsequent semi-annual conferences will be devoted to standards of living as affected by science, the economic system in relation to economic progress, government policies and science, and finally, science and human beings. Dr. Harold G. Moulton, president of the Brookings Institution, Washington, is organizing the inquiry and will deliver the opening address.

Science News Letter, December 4, 1937

EXPLORATION

Botanist-Missionary Returns; Navigated Difficult Strait

Plants, Insects, Minerals and Ancient Weapons Are Among the Treasures Brought Back From Arctic Trip

BACK again from the far Canadian Arctic, the missionary-botanist Père Arthéme Dutilly is sorting specimens in the laboratories of the Catholic University of America. He has brought 1200 sheets of pressed plants, 1000 insects, several scores of soil and mineral samples, and a large number of old-time weapons and tools of the Eskimos.

The Eskimo people, Père Dutilly reports, are changing fast, abandoning and even making fun of the finely wrought ivory harpoons, bone needles, etc., they formerly used, and substituting steel and other metals wherever they can. So it is easy to get excellent old implements for museum purposes.

In their clothing as well the Eskimos are rapidly becoming "westernized." Older members of the family may stick to the traditional fur parka, but the younger generation must have sweaters and even rubber-soled sneakers, at least for summer wear. Even in five years the amount of changes has been notable, among the Eskimos near trading posts.

Père Dutilly's farthest north this year was only about 70 degrees north latitude, at a small island just off the coast of Baffin Land, called Iglulik. This is a settlement of about 270 persons —a veritable metropolis, as Eskimo towns go.

To get to Iglulik it was necessary to pass through a long reach of water noted on the maps as Frozen Strait, supposedly a very difficult thing to do. Père Dutilly gives great credit to the commander of the Oblate Missionaries' 120-ton motor vessel "Thérése," Capt. Joseph Levesque, for the easy and safe passage.

During the entire voyage, constant radio communication with trading posts, other vessels, and civilization far to the south was maintained, as well as daily broadcasts from the "Thérése." Père Dutilly was radio operator as well as botanist. In addition, he played the part of Daniel Boone afloat, killing a huge polar bear overtaken by the boat, with a single well-placed shot.

Science News Letter, December 4, 1937

ARCHAEOLOGY

Greenland Relics Show How Eskimos Conquered Vikings

WAR IN THE North, long before the days of Columbus, waged in the ice and snow of America's Arctic between white invading Norsemen and native Eskimos, is now being discovered by science.

To the Smithsonian Institution, a modern Norseman, Dr. Therkel Mathiassen of the Danish National Museum, reports that Greenland's Arctic earth is relinquishing tragic trophies of Norsemen massacred when the white pioneers of about 1350 attempted to get a foothold in the New World. These could not be peaceful gifts, Dr. Mathiassen reasons. Norse colonists would never have given natives their churchbells to turn into hammers or eardrops, for example.

Dr. Mathiassen, who has spent nine summers exploring the Canadian Arctic and Greenland for clues to the Eskimos' prehistory, found the Eskimo village containing these Norse relics at a little island called Inugsuk, off northwest Greenland.

JEUNESSE EXOTIQUE

Mother, in parka, remains old-fashioned, but the younger set affect London modes —via Hudson Bay Company.

This Eskimo story, so far pieced together, shows Eskimo migrations in a rough way for the past thousand years. A village site in the Canadian Arctic, unearthed by a Danish expedition in 1922, revealed ancient Eskimos there who had been whale and seal hunters and who used materials obtained from these sea creatures in their houses, clothes, and utensils. These Eskimos had probably come originally eastward from Alaska or Siberia. Some reached Greenland and became its first Eskimo inhabitants.

The site at Inugsuk, Greenland, containing Norse relics, shows these Eskimos at a later time, when they had acquired new inventions, and even seem to have borrowed ideas from medieval Norsemen, who were five or six hundred miles away to the south. Linking these Eskimos with the Norse settlers enables archaeologists to date this state of Eskimo culture definitely in the thirteenth and fourteenth centuries.

This was the era when Eskimos and Norsemen fought it out. The Eskimos won. Like Indians in the United States, the Eskimos did not start fighting white men in earnest for some time after their arrival. Eric the Red had discovered Greenland in 985, and Norse colonies were soon planted, but it was not until about 1200 that Norsemen in Greenland

saw their first Eskimos. Dr. Mathiassen explains that this was because the Eskimos clung to northern latitudes, suitable for dog sledges and their ice hunting, but later the Eskimos spread southward and in the fourteenth century they were attacking Norse settlements, burning Norse houses, after blocking the doors, taking savage vengeance on captives, and plundering the smoking ruins for any valuables after a massacre.

Norse in Greenland were by this time a degenerate, pitiful set of colonists, as archaeologists have shown by finding the skeletons marked by signs of malnutrition and sickness. By the time Columbus arrived in the New World, the Greenland wars were won—by the Eskimos.

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MEDICINE

"Aluminum-Rubber-Lung" Less Expensive Than Iron One

A RELATIVELY low-cost "rubber aluminum-lung" for keeping alive patients whose breathing apparatus is paralyzed by infantile paralysis, will shortly be offered commercially. Of Swedish origin, this respirator is intended to perform the same function as more costly "iron lungs" now in use.

Based on principles first worked out by Dr. Bo Sahlin, assistant professor at the Physiological Institute, Lund, Sweden, the new Stille-Scanlon respirator utilizes a plate of aluminum which is made to fit closely the patient's body by rubber fittings. Differences in air pressure within this apparatus raise and lower the patient's breathing muscles, replacing the damaged natural function of the lung action. An advantage of the new respirator is that it covers only the thorax and the abdomen.

Science News Letter, December 4, 1937

ARTIFICIAL LUNG

MEDICINE

Viruses Do Not Always Cause Disease Symptoms

MOST people think of viruses as the invisible cause of certain diseases. Infantile paralysis, influenza and the common cold, smallpox and various other human ails are virus-caused. Domestic animals are affected by virus-caused diseases such as hoof and mouth disease, and plants are attacked by still other viruses.

Tobacco mosaic is a well-known virus-disease of plants. Viruses can even attack bacteria, the micro-organisms commonly called germs. Bacteriophage, used to fight certain kinds of disease, is a virus that attacks bacteria.

There are viruses, however, which can exist in the body without producing any signs of illness. Besides being so small as to be invisible—no microscope is powerful enough to make them visible—viruses can also be "inapparent."

This adjective is applied by Dr. E. V. Cowdry, professor of cytology at Washington University School of Medicine, in a report to the Scientific Monthly.

Even the dread infantile paralysis virus is inapparent much of the time, Dr. Cowdry points out. It is estimated that many children and at least four-fifths of the adults living in cities have mild, undetected attacks of infantile paralysis which gives them immunity or protection against further attack. Otherwise, during epidemics of infantile paralysis, many more persons would be sick than actually are.

Many of the inapparent viruses, however, are unknown, or known only to scientists working in this particular field. Some of them became known by accident. These viruses produce changes in some of the cells of the body, but the changes are not great enough to cause illness. If tissues containing these inapparent viruses are ground up, dissolved and injected into other animals, and the process repeated through several transfers, the virus may finally become apparent and cause signs of disease.

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ASTRONOMY

Prominent Star Gradually Decreases in Brightness

GAMMA Cassiopeiae, one of the sky's prominent but variable stars, has decreased in brightness in recent months. Dr. C. M. Huffer of Washburn Observatory has informed Harvard College Observatory that this star has changed from magnitude 1.75 on May 7 to 2.46 at the beginning of this month. Members of the American Association of Variable Star Observers confirmed this stellar change and found the most pronounced change occurred in October.

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PHYSICS

New Orderliness in Nature; Liquids Have Hidden Structure

New Theories of Origin of Universe Also Discussed At Physical Society Meeting; Gravity Force Lessens

A HIDDEN "structure" has been discovered in splashy, fluid water and other liquids, it was disclosed at the meeting of the American Physical Society at the University of Chicago. The seemingly formless nature of fluids, which enables them to take over the shape of any vessel containing them, is only a mask behind which hitherto unknown arrangements of atoms are in action.

Two reports show how physicists are unwrapping this cloak from discoveries pointing to a previously-unknown orderliness in nature.

Prof. G. W. Stewart of the University of Iowa described his investigations of very dilute solutions of such salts as sodium chloride and potassium chloride.

Using a special kind of scattering of X-rays, known as diffraction, Prof. Stewart was able to compare the "structure" of these solutions with the "structure" of pure water and to note the differences created by the addition of the salts.

Using different materials but essentially the same X-ray method, Prof. Frank H. Trimble of Northeast Missouri Teachers College and Prof. Newell S. Gingrich of the University of Missouri confirmed reports of a new type of atomic "structure" in liquids.

Liquid sodium was the material chosen for study. It was found that with increasing temperatures the concentration of atoms about any one atom was much less than for lower temperatures. As expected the increased temperature tends to destroy this new kind of "structure."

Prof. Peter Debye, famed German chemist who has won the Nobel Prize, has declared that liquids are much more closely related to solids than they are to gases because of certain similarities between this new type of "structure" and the structures of solids.

Seek New Theories

Scientists are seeking some better explanation of the origin of the universe than the present-held idea that a tremendous, primeval explosion sent its parts flying off into space.

Under this expanding universe concept, the universe was likened to a giant soap bubble that started spreading in a catastrophic explosion billions of years ago. This rushing-apart of the universe, it was said, has been going on ever since.

A strange shifting of the light from the distant nebula toward the red colors was the observable fact which led to this expanding universe concept, advanced by the Belgian scientist-priest Abbe LeMaitre. This so-called "red shift" was interpreted as being caused by the rushing away of these distant members of the stellar universe. The idea was analogous to the lowering of pitch of a train whistle as it shrills while rushing away from the observer.

Astronomers throughout the world and particularly the scientists at Mt. Wilson Observatory with their great 100-inch diameter telescope supplied the bombardment of observable fact which has led to a search for a better theory than that of a universe in rushing expansion.

Must Be Larger

Dr. Edwin C. Hubble, Mt. Wilson astronomer, recently pointed out that something had to be done, for if the red shift of the light from distant nebulae was correct, the Mt. Wilson instrument was looking out into space nearly to the limits of the universe. Why this conclusion was arrived at is a whole separate and complex story which need not concern us here. The point is that astronomers cannot believe that they are now looking to the limits of space.

The alternative which Dr. Hubble suggested was that, perhaps some yet undisclosed new principle of nature was operating. Since Dr. Hubble's report, scientists have been seeking to interpret the red shift in other ways.

Prof. Arthur Haas, Austrian theoretical physicist now at the University of Notre Dame, recently offered one alternative picture by suggesting that the observed red shift might be explained if light rays became weaker in energy—became tired, in effect—in their journey over millions of millions of miles and millions of years of time from the distant nebulae to the astronomer's telescopes on earth.

At the Physical Society meeting, Prof. Haas described calculations showing that the dilemma of the red shift could be circumvented if the total mass in the Universe were increasing with time. An increase in mass, for each second of time, amounting to 100,000 times the mass of the sun would solve the difficulty.

This concept of a universe continually growing heavier is one conclusion, said Prof. Haas, of a new theory of the universe which was proposed several months ago by the English physicist, Prof. P. A. M. Dirac, who has won the Nobel Prize for his mathematical achievements in the realm of physics.

Great Ratio Squared

Prof. Haas added that the basic hypothesis of Dirac's theory is that the total number of primordial particles of matter in the universe is equal to the square of the ratio of the radius of the universe to the radius of the electron. The ratio is an enormously large number, for the radius of the universe is about the largest imaginable number which has any real meaning and the radius of the electron comes close to being the smallest imaginable number with equal real meaning. And the square of this ratio, of course, is enormously larger.

Prof. Haas showed that Dirac's assumptions may be deduced from simple and plausible principles which seem to be basic in the physics of the universe.

Equally ingenious in seeking to find some new and yet-undetected principle of nature was the suggestion of Ira M. Freeman of Central College, Chicago.

Mr. Freeman suggested that the force of gravity decreases gradually through the ages and ages of time during which the universe has existed. If this starting concept really exists it means that the pull of everything in the universe for everything else becomes less as the ages of time roll on. This is like saying that a stone weighing 100 pounds now will weigh 99 pounds in a billion or so years. And the decrease in weight, it must be explained, is not caused by weathering or any factors other than the dwindling of the force of gravity.

Mr. Freeman's idea is said to account for the reddening of the light from the most distant nebula. But scientists will probably wish to give it much thought before accepting it.

Scientists studying the still-mysterious and piercing cosmic rays which continually strike the earth and everything on it, from the depths (*Turn to Page 366*)

ASTRONOMY

How Do Sunspots Affect Man's Life on Earth?

DID you know that the best vintage wines are from crops that grow in those years when sunspots are at a maximum? And that trees show their greatest growth in periods when the surface of the sun shows the greatest number of spots? Or that the Dow-Jones stock market averages follow a curve which is very similar to curves based on sunspot numbers?

These are only a few of the many remarkable, but unexplained, coincidences between the activities of plant and animal life on earth and the appearance of those gigantic electro-magnetic disturbances on the sun which man calls sunspots.

More and more scientists, and others, are probing sunspots and seeking to learn the relationship between their appearance and the multitudinous activities of earth-bound man. In his newest book "Sunspots and Their Effects from the Human Point of View," (McGraw-Hill) Dr. Harlan True Stetson, astronomer and research associate of the Massachusetts Institute of Technology, summarizes the knowledge which science now has in its possession to analyze, for the truth or falseness, the speculation on this intriguing matter.

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ARCHAEOLOGY

Britain's Stone Circles Explained; Indoor Temples?

WHEN Stone Age man and his wife in Britain came to worship at the famed place called Stonehenge, they may have had comfortable seats indoors.

In other words, the great stone circle of ruins, now one of England's prize mysteries, may once have been a covered temple.

Visitors at Stonehenge gaze up at the 16-foot stones that outline a great circle. They point out the inner circle and horseshoe of stones, and the altar-like arrangement of stones within. In their minds, they conjure up a picture of Stone Age Britons gathering in the open air by moonlight or at sunrise for strange, barbaric rites of worship.

But that prevailing picture is wrong, according to a theory advanced by Prof. A. Vayson de Pradenne of the University of Paris, in the British archaeological journal *Antiquity*. The prehistoric builders constructed a roof and walls of massive beams and earthen plaster over the stonework skeleton, he believes. And to see what the building was like, we have only to look at an American Indian earth lodge, in the Great Plains region. Even the plan and proportions of Stonehenge bear striking resemblance to an Indian meeting house, save for the stone framework.

Technical difficulties of roofing a building 108 feet in diameter would not baffle early Britons who could move 40-ton boulders. So argues Prof. de Pradenne. Beams less than 30 feet long would have been big enough to use. A turf covering for the roof was probably added, he explains. And the completed structure would serve to keep dry the sacred objects, and the priests who must perform their duties in a climate that was even rainier than England today.

That Stonehenge was a place of worship seems logical to Prof. de Pradenne. But whether it was a meeting house, tomb, or dwelling, he believes wood and stone were combined to make it a roofed structure. And he suggests that other prehistoric ruins of giant stone may well be examined closely, to see whether they are not mere skeletons of larger structures once built with wood.

Science News Letter, December 4, 1937

GEOGRAPHY

New Survey Finds That Mt. Whitney Is Highest

MOUNT Whitney is still the highest mountain in continental United States, but second and third places have been interchanged as a result of recent surveys by the U. S. Coast and Geodetic Survey and the U. S. Geological Survey. The new heights for the five highest peaks in the United States are:

Mount Whitney, California, 14,495 feet, lost 1 foot.

Mount Massive, Colorado, 14,424, gained 5 feet.

Mount Elbert, Colorado, 14,420, lost 11 feet.

Mount Rainier, Washington, 14,408 feet, same.

Mount Harvard, Colorado, 14,375 feet, lost 24 feet.

The gains and losses are not actual. So far as we know, the heights of these peaks above sea level are the same now as they were a few years ago. The change in heights is due to more accurate surveys since the last set of altitudes was announced in 1936.

Science News Letter, December 4, 1937

IN SCIE

METEOROLOGY

Frost-Beauty Perfected Only With Right Conditions

See Front Cover

FROST silvers the commonest things into beauty, once in a while in early winter. We awake to find that instead of the thin, hard, blighting film of white there has been deposited during the night a thick rime of furry frost that transforms even the most commonplace garden plants and wayside weeds into Christmas-trees of fairyland.

But like the magic of the fairies, there must be an exact balance of correct conditions before this can occur. The night must be still. There must be abundant moisture in the air—even to the point of fogginess. Finally, the ground and objects near it must be enough colder than the moisture-laden atmosphere to cause a precipitation of the water, not as dew, but as fine splinters of ice.

Some garden plants, transfigured by such a delicately-achieved meteorological miracle, were photographed for the cover of this issue of the SCIENCE NEWS LETTER by the late Cornelia Clarke.

Science News Letter, December 4, 1937

PHYSICS

Solar Cooker Exhibit Wins Medal For Designer

DR. Charles G. Abbot, Secretary of the Smithsonian Institution of Washington, D. C., has been awarded a gold distinguished service medal by the Great Lakes Exposition for his solar cooker, which has been on view at the exposition during the past summer.

Dr. Abbot's solar cooker, a boiler heated by the sun and so named because the first time Dr. Abbot demonstrated it, it was used for cooking, was one of the "Making of a Nation" exhibits. The model shown was an improvement over the one the Smithsonian scientist demonstrated a year ago. It featured an automatic control which stopped the flow of water into the boiler when the sun went behind a cloud and turned it on when the sun reappeared.

Science News Letter, December 4, 1937

E FIELDS

MEDICINE

Ultraviolet Light Promises Vaccine Against Rabies

A VACCINE against rabies or hydrophobia, dread disease of dogs and other animals including man made with the aid of ultraviolet light seems a possibility, as a result of experiments reported by Drs. H. L. Hodes, G. I. Lavin and L. T. Webster of the Rockefeller Institute for Medical Research. (*Science*, Nov. 12).

Dr. Webster has recently been trying to develop a more effective vaccine against rabies than the one now available. In the experiments reported it was possible, he and his associates found, to destroy the harmful quality of the rabies virus without destroying its ability when injected into mice to protect them against lethal doses of the disease-causing virus.

Science News Letter, December 4, 1937

ENGINEERING

Molasses Roads Adaptable For Drier Western States

SOUTHERN farmers spurred by the hope of using cotton in road building, now have an additional reason for glee in reports from India that molasses roads are a success. The prospect of finding another outlet for America's sugarcane crop is intriguing.

India's molasses highway has been mentioned previously but American highway engineers have been sitting, with their fingers crossed, awaiting details of construction and some independent analysis of costs. Now these important facts can be told, for the Department of Commerce has just received reports from Vice Consul Aubrey E. Lippincott at Madras, India; reports which they feel can be trusted.

The cost of the molasses road on the Bangalore-Mysore highway is 304 rupees per mile which comes out to be about $112 in current rates of exchange.

This cost compares favorably with the roads treated with calcium chloride which are being used in northern regions in the United States. Like such roads the molasses highway would be considered second-class road in this country from the standpoint of traffic.

Ten tons of molasses are used to a mile of highway. This is mixed with well-slaked lime and charcoal powder in the ratio 4:2:1, respectively, by volume. It takes about four hours for the final coat to set and while still slightly soft, sand is spread over it and the surface is rolled. Traffic is allowed over the highway the next day.

Despite several heavy rains, the molasses appears not to wash out unduly. What the highway would do in a region of greater rainfall is problematical. It lies in terrain where the annual rainfall is only six inches.

Seeking comparable American rainfall conditions it appears that such highways might be adaptable for Arizona, Idaho, Utah, New Mexico and southern California. The success of such roads in the molasses "belt" of the southern states is still questionable.

Science News Letter, December 4, 1937

GEOLOGY

Great Lakes May Supply Clue to Subsea Canyons

ICE-CARVED lake basins in North America and Europe may supply clues that will solve the problem of the subsea canyons which have excited the interest of geologists recently. In reviewing the evidence of ice-cutting of the basins of the Great Lakes and other lake basins, Dr. Francis P. Shepard, University of Illinois geologist, points out that an average thickness of the continental ice of four miles or more during the most recent glacial period would account for both the cutting of the deep lake basins in the northern parts of Europe and America and a lowering of sea level sufficient to account for the submerged canyons.

Supporting the theory that the basins of the Great Lakes were largely cut out by glacial ice, Dr. Shepard cites the evidence of large amounts of fresh rock piled on the southern shores of the lakes. The ice came from the north, and the rock almost certainly came from somewhere in the present lake basins.

Other basins, many of them submerged on the continental shelves, not far from the puzzling submerged canyons, were also cut by the glacial ice, according to Dr. Shepard, and but for a slight increase in sea level would form a number of lakes whose total area would exceed that of the Great Lakes.

Science News Letter, December 4, 1937

ORDNANCE

Machine Guns Aimed by Remote Control Device

A REMOTE control device to direct the fire of machine guns has been granted a U. S. patent. The device was invented by Lucien Albert Boussel of Courbevoie, France.

Assigned to the Societe Anonyme des Anciens Etablissements Hotchkiss et Cie, well-known French machine-gun makers, the device is intended particularly for use in fighting planes, to permit a pilot or gunner in a central cockpit to fire guns mounted out in the wings.

Cable relays fire the guns simultaneously or in succession at will, according to the papers, numbered 2,097,962. The Hotchkiss works is one of the French arms firms not taken over by the French government under the terms of the arms nationalization decree passed by the former Blum cabinet.

The invention, certain to be ranked as an important military device, has been patented in England as well as in France and this country. No secret is apparently made of the way in which it operates, presumably because European nations have all either independently invented, bought or secured by more devious means, designs for similar apparatus.

Science News Letter, December 4, 1937

ARCHAEOLOGY

Treasures Lost by Robbers Now Saved By Science

BECAUSE robbers were in a hurry, 3,100 years ago, America now may inspect the greatest collection of gold and ivory objects ever saved from ruins of ancient Palestine.

The collection, discovered last spring in the treasury of a palace at Megiddo, were put on exhibit in the Oriental Institute's museum, Chicago, November 1. The Institute's expedition made the discovery and will eventually have part of the collection permanently, after the Palestine Department of Antiquities has divided the objects.

Archaeologists owe their lucky find to excitement of robbers who plundered the Canaanite palace in the eleventh century B. C. The looters tore necklaces apart, dropping gold and carnelian beads and other ornaments. They flung aside ivory carvings, which were ornamental plaques, furniture inlays and other ornaments, and these now reveal much information about Canaanite art.

Science News Letter, December 4, 1937

PALEONTOLOGY

Dinosaur Memorial

Cliff in Utah Is Being Carved To Show Forms of Great Creatures—The Bones Themselves, Not Images

By DR. FRANK THONE

MUSEUM walls offer magnificent opportunity and challenge to curator, sculptor, mural painter. You can back up against them a pair of majestic Assyrian winged bulls, brought from a long-buried city of the East. You can cover them with Byzantine mosaics, rescued from the ruins of an ancient basilica. You can paint upon them vivid panoramas of life as it was when the earth was young. Super-blackboards they are, in the museum's super-schoolroom, disciplining even grownups into learning something of their lesson through the sheer authority of their wonder.

In the halls of the great museums where the mighty bones of giants of the past are displayed, it is not uncommon to set against the walls' wide spaces huge slabs of rock with the dinosaur fossils still sticking in them, the stone chiseled away to leave the bones projecting in high relief. A paddle-limbed plesiosaurus, for example, just as he sank to the bottom and died and decayed, a hundred million years ago, scarce a bone in his immense skeleton budged out of place. Or a land-dwelling dinosaur, as its great carcass was borne down to the sea by some tremendous river flood of ancient time ("a mountain of a mummy," in Jack Falstaff's watersoaked phrase) and silted over with fine-grained stuff that afterwards slowly hardened into sandstone. We have all seen such preparations, and given them the tribute of our awe and wonder. Scientists, we tell each other, must be very clever fellows, and remarkably patient, too, to work out all the striking detail of these lucky finds.

On Mountainsides

But scientists are out now to outdo their own accomplishments. Not even the long and lofty halls of the greatest museums suffice to contain their ambitions. Sculptors have forsaken studio and art gallery to drill and blast whole mountain sides into the images of national heroes and statesmen; students of the earth's cyclopean past will have their mountainside carvings, too.

The world's first carven cliff of dinosaur bones is now shaking under the drills and picks and hammers of workmen preparing the way for the scientific chiselmen who will follow, to bring about the resurrection of a whole mass of saurian fossils and show them, in place, as on a mighty wall, to be seen and wondered at of men.

National Monument

The place is Dinosaur National Monument, in northeastern Utah, one of the smaller areas included in the U. S. National Park system, but not administered as a National Park. There are many such National Monuments scattered over the country. The name is simply a convenience-classification; it does not necessarily imply that a given area has anything monumental about it. Dinosaur National Monument, however, really has monumental possibilities, and they are in the process of being made real and visible.

The concept of carving away the stone covering that hides a whole cliff of dinosaur bones is a bold one. It was originated by the curator of vertebrate paleontology at the American Museum of Natural History, Dr. Barnum Brown. A really good museum curator must have some sense of showmanship; and while there is nothing circusy about Barnum Brown, he does get ideas that would unquestionably have won the respect of the original Barnum for his more scholarly namesake.

Like all bold concepts, the idea of a cliff-face museum of dinosaur bones is fundamentally simple. It takes advantage of two outstanding things; a most unusual accumulation of saurian fossil skeletons, many of them complete and little disturbed; and a lucky chance of geology that turned what was once a floor into a wall.

Lagoon Floor

When the dinosaur bones were deposited in the particular stratum that is the reason-for-being of Dinosaur National Monument, that stratum was the bottom of some cozy coastal lagoon or wide river estuary. The great carcasses drifted into one rather limited area, nudged along by some trick of wind

EXCAVATION SITE

An aerial view showing tram lines for dirt removal and, in background, workers' camp.

CARVING OUT THE BONES

Showing the work in progress. Square markings aid in charting the exact position of the skeleton in the rock.

or water current, sank to the bottom, and eventually became buried skeletons.

That was in Jurassic time, which ended about 125 million years ago. The Jurassic was the heart of the 200-million-year-long Age of Reptiles—the Thirteenth Century of the earth's zoological Middle Ages. Then ruled on earth, and in the heavens above, and in the waters that are under the earth, such an array of reptilian giants as were never before seen and never shall be seen again. Greatest of these, at least in bulk, were the sauropods; they included the monster brontosaurs and diplodocus, and the rarest and most gigantic of all, the huge barosaur—bodies as big as boxcars, necks like palmtree trunks, interminable tails. Barosaur measured 80 feet over all.

Into the quiet water of the ancient lagoon they drifted, their skeletons piling up side by side and overlapping each other—a charnel-pit of giants, under the water and the drifting silt. Ever thicker piled the silt; with unimaginable slowness but with inevitable sureness it hardened into stone, sealing the fossilized bones tightly in place. All this time the land was flat; the great mountains of the West had not yet begun to lift their heads.

Young Hills

Then the slow heaving began. The mountains grew to the youthful ripeness that is now theirs—for the Rocky Mountain system is young, geologically speaking. Strata were bent and tilted until some of them stood on end. Among them were the strata in which the dinosaur bones were sandwiched; they finally came to stand at an angle of 80 degrees—just a little back-slope from the vertical.

How much of the dinosaur layer was exposed to the weathering of ages and so lost, fossils and all, can never be known. But the part that is left is a veritable Bonanza of bones—thousands upon thousands of them, waiting to be mined.

For the "cliff" of fossils which Barnum Brown's enthusiasm and tenacity is changing from dream into reality is a buried cliff. You have to dig down and clear away the other rock layers from in front of it to get at it. The sculptors take an existing cliff and carve faces and figures upon it. The scientist has to make his cliff first; but the patterns for the sculpture will be on it when he gets it dug out.

Great Slab

Dinosaur bones were first dug at this site by Dr. Earl Douglass of the Carnegie Museum of Pittsburgh; the U. S. National Museum and the University of Utah have also removed many fossils. These diggings worked across the exposed top of the fossil-bearing stratum, and down either end; but there is still a great buried slab in the middle. It is to expose this that an artificial canyon is now being dug in front, by various groups of Government emergency labor under the direction of the U. S. National Park Service.

After this deep, long pit has been completed will come the turn of the skilled chiselmen of the American Museum of Natural History. With air-driven tools they will carve away the embedding matrix of stone from around the bones, leaving them firmly fastened to the background with the cement of ages, but standing out clear and bold in high relief.

This is very "fussy" work. You are not carving in blank stone from a model before you; the model is buried in stone of almost the same color, and you have to cut to a hair's-breadth accuracy. A millimeter too little and you have left your work messy; a millimeter too much and you have ruined a bone. It will be an anxious job, requiring two and a half years for completion. Fragmentary bones will be cleared away, leaving only the connected skeletons.

It will not do, of course, to leave these carefully carved-out fossils exposed to the weather, particularly the powerful weather of the West, stormy in winter, hot in summer. The precious carvings would begin to erode away immediately.

So Dr. Brown's plans call for a vaulted roof to cover the whole thing—the artificial canyon forty feet wide, with its north wall, bearing the fossil carvings, thirty feet high and 190 feet long. The building will be mostly roof, because the entire "hall" is under ground.

Dr. Brown visions it: "Spotlights will be directed on each of the skeletons. In the center of the room are to be placed

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lifelike models, made to scale, of each of the animals whose skeletons are seen in the rock, and on the south vertical wall of the building will be placed a gigantic mural 190 feet long and 20 feet high, showing the topography of the country, the flora, and the animals in their natural habitat as they existed 140 million years ago."

The National Park Service will have charge of the completed exhibit. Administration buildings and living quarters will of course need to be erected, with water supply and general improvements, and a huge parking space for the accommodation of motorists.

There is a third party to the undertaking, the State of Utah. Utahans have a right to be proud of their "show", which will be the only thing of its kind in the world. Thousands of people will come from everywhere, desiring to behold and wonder.

Utah therefore comes up with its share. It has added to the original bit of land (a mere 80 acres) that constituted Dinosaur National Monument twelve whole square miles, taking in most of the adjacent spectacular scenery. Utah will also construct a difficult piece of road connecting with National Highway 40 at the town of Jansen.

The wonders that we shall go out into the desert to see are still unknown. They will not be disclosed until the tools of the American Museum chiselmen begin to eat into the huge slab of rock which Government emergency workers are now laying bare in the rough.

But there is every reason to believe that the show will be a good one, for the "samples" that have been collected from around the central slab comprise samples of just about everything the heart of an ardent dinosaur fan could wish for.

Harken to Barnum Brown's catalog of things already (*Turn to Page 366*)

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DOGGING PUSSY'S STEPS

So close after Pussy was the dog in this ancient cat-and-dog chase that the two paws touch. A soft brick over which they scampered caught this footprint record.

ARCHAEOLOGY

Dog-Chases-Cat Is News When It's Dug Up in India

DOG-CHASES-CAT isn't ordinarily news. But when it happened 5,000 years ago in India, and when footprints of the dog and cat are discovered by archaeologists—that's news.

Pussy is more important than Fido in this case: for, until this discovery, no one associated pussycats with ancient India. Tigers, yes; but the household cat supposedly came to India far later than 3000 B. C. Yet, here is the mysterious print of a very ancient cat's paw, and right on her heels is the paw print of a dog, about the same size.

The prints are on a clay brick, from ruins of Chanhu-daro in the Indus Valley of northern India. These are the ruins that have attracted wide interest because of great quantities of toys found in the old city. Quite evidently, Chanhu-daro was a toy manufacturing center, certainly the oldest ever found. The site has been explored by a Joint Expedition of the Boston Museum of Fine Arts and the American School of Indic and Iranian Studies.

The paw prints at Chanhu-daro have been preserved all these centuries, because the animals happened to scamper over a brick that was moist and fresh. No one smoothed off the paw marks, and they hardened into a permanent record.

How does this cat fit into cat history?

Egypt is accepted, almost without question, as the first home of the domestic cat. Early Egyptians, risking scratches, tamed a wild cat of northwest Africa. They venerated it, among other animals reverenced for special qualities, and many a cat was mummified when it died.

From Egypt, cats were carried to other

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RADIO

December 9, 4:15 p. m., E.S.T.

BIG GAME IN THE NATIONAL PARKS
—Dr. H. C. Bryant of the National Park Service.

December 16, 4:15 p. m., E.S.T.

WIVES BY THE DOZEN—IN AFRICA—
Rev. Edward Ward of the Catholic University of America.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

regions, in a rather gradual spread, and some local wild cat tribes became blended in the cat race. Etruscans acquired these cats centuries before the Christian era; China about the beginning of the Christian era; England not until about 900 A. D.

And now India's most ancient civilization turns up with a cat, and a new mystery for archaeologists to explain by further digging.

Science News Letter, December 4, 1937

ENGINEERING

Use of Construction Steel Likely To Increase

FOUR and a half billion tons of steel, a billion tons more than at present, will be required to meet America's construction program in 1947, a decade from now.

Some of that steel will go into railroads, bridges, skyscrapers, homes—uses to which it has been put many times in the past. But more of it will go into elevated automobile highways than ever before.

This was the picture of the steel industry and steel construction which emerged from discussions by engineers attending the fifteenth annual convention of the American Institute of Steel Construction.

Use of steel for construction purposes has increased by one-fourth every ten years, F. E. Schmitt, editor of the Engineering News-Record, declared. The present three and a half billion tons a year should become four and a half billion tons a year in another decade, he asserted. Henry M. Stevens, J. Walter Thompson Company vice-president, predicted that other cities would follow New York in building elevated express highways to solve a mounting traffic problem.

Science News Letter, December 4, 1937

Meat of the pistachio nut contains an oil similar to sperm oil.

MEDICINE

Anti-Tuberculosis Vaccine Gives Encouraging Results

AN ANTI-TUBERCULOSIS vaccine to protect young children from the dread disease has been developed at the Saranac Laboratory, Saranac Lake, N. Y. Encouraging results with animal trials of the vaccine were reported by Dr. H. M. Kinghorn and Morris Dworski at the meeting of the American Clinical and Climatological Association, at Baltimore.

The vaccine, result of 11 years of work at the Saranac Laboratory, is still in the experimental stage. Dr. Kinghorn and Mr. Dworski stressed the point that reliance should not be placed solely on vaccines to prevent tuberculosis but that all present precautionary measures should be faithfully and carefully carried out.

The Saranac vaccine is obtained from the caseous or cheesy tuberculosis mass in the center of a cow's lung or cow's gland, and is thoroughly sterilized before using. It has been tested against the vaccine of Robert Koch, and found to be greatly superior to Koch's vaccine. It has also been tested against the vaccine called BCG of the late Dr. A. Calmette of the Pasteur Institute of France, and has been found to be of equal value to this.

Calmette's BCG is an attenuated or weakened bovine or cow tubercle bacil-

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Beginning January 1, 1938, the *Journal of Morphology*, heretofore a quarterly, will be issued bimonthly, on the first of January, March, May, July, September, November.

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Volume 62, No. 1 will be issued January 1, 1938.

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lus. Vaccine of the Saranac Laboratory contains a virulent bovine tubercle bacillus, but is killed.

Dr. Kinghorn hopes that this caseous vaccine, when perfected, will be of decided value in preventing the development of tuberculosis in young children who have no tuberculosis.

Science News Letter, December 4, 1937

From Page 359

of outer space, are adventurers. They have climbed rugged mountain peaks, carried their instruments high into the stratosphere in balloons, sailed the seven seas and sank their equipment deep in lakes.

Now, it is disclosed at the meetings of the American Physical Society that they have donned miners' crash-helmets and carried their delicate measuring apparatus into deep mines.

V. C. Wilson of the University of Chicago reported to the physicists' meeting his experiments carried out in a mine in Michigan to a depth of 1600 feet.

The mine chosen had its shaft slanting at 34 degrees to the vertical so that by placing the instruments at different places along the shaft any thickness of rock could be studied for its absorption of the rays.

At the maximum depth of 1600 feet it was found that the piercing radiation still came through the great rock mass. Its value, however, was only one twenty-thousandth of the intensity at the surface.

Science News Letter, December 4, 1937

Short-wave radio sets have proved so useful in emergency communication in U. S. National Forests that 2,300 sets are in use.

ECOLOGY

NATURE RAMBLINGS

by Frank Thone

Insect Specialists

SOME flowers insist upon the attention of specialists for accomplishing their pollination.

Not many, to be sure: the vast majority of flowers have open, easily accessible nectar and pollen stores, so that the ubiquitous honeybee and other insects of about the same size and lack of specialization can visit them and perform this vital service toward the production of fruit and seed. Apple and alfalfa, orange and white clover, buckwheat and tulip-tree, a wide variety of others, find the "old family bee" quite adequate.

But there are some flower forms that have become so highly specialized that only a correspondingly specialized insect can be of any use to them.

Particularly is this true of flowers with very deep, narrow throats, like tobacco, petunias, and certain species of lilies, like the beautiful white Madonna lily. The insects that can most successfully pollinate these are certain species of hawk-moths—those big-bodied, whirr-winged moths that some persons mistake for hummingbirds. Hawk moths have tongues so long that usually they never touch the flowers with their feet—just hover with their heads partway into the tube, and thrust that incredible proboscis down after the nectar. And, incidentally, daub their heads and bodies with pollen, to be carried to the next flower they visit.

Hawk-moths are so important to one of our major commercial crops, tobacco, that if their numbers were seriously reduced—say by the eradication of the weeds their big, fat caterpillars feed on, it would be necessary to begin the cultivation of special patches of food plants for them.

Bumblebees are another important group of long-tongued insects essential to the welfare of an important crop, this time red clover. Breeders have been trying to get a short-flowered red clover that honey-bees can pollinate, but bumblebees still remain a heavy standby to the red clover seed crop.

Charles Darwin is credited with a classic ecological chain, proving that old maids are necessary to the clover crop. Something like this: Old maids keep cats. Cats kill field mice. Bumblebees find good nesting-places in the empty mouse burrows. The more bumblebees the better the clover crop. Q. E. D.

Science News Letter, December 4, 1937

From Page 364

removed, during earlier museum collecting expeditions:

"The specimens that have been removed from this quarry represent eleven genera of dinosaurs, mostly gigantic sauropods, also crocodiles, turtles, and a lizard; and we have reason to believe that other genera are represented in this accumulation.

"The bones are unusually well preserved and but little crushed. It is a veritable Noah's Ark of animal remains characteristic of the Jurassic Period.

"Here are skeletons of the largest of the sauropods mingled with the skeletons of powerful but smaller flesh-eating dinosaurs, the heavily armored forms like *Stegosaurus*, as well as the smaller bird-like dinosaurs. Intermingled with these are an occasional turtle-shell, crocodile remains, fresh-water shells, cycads, fossil leaves, and wood fragments."

All on a tilted table 190 feet long and 30 feet wide—a dainty dish to set before an interested public!

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Science News Letter, December 4, 1937

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Additional Reviews On Page 368

Gardening

NORTH AMERICAN ROCK PLANTS (First Series)—W. H. A. Preece—*Macmillan,* 204 p., illus., $3.50. A book the ambitious home gardener will prize. Half the pages are full-page halftones; the descriptions opposite tell briefly but satisfactorily what the plant is like and what kind of habitat it must be given.

Science News Letter, December 4, 1937

Gardening

THE PRACTICAL BOOK OF GARDEN STRUCTURE AND DESIGN—Harold Donaldson Eberlein and Cortland Van Dyke Hubbard—*Lippincott,* 233 p., illus., $5. Discussion of the planning and making of gardens, with all imaginable accessories from pools to bowling greens, is thorough and practical, and 233 good collotype illustrations show how the points discussed have been actually worked out in existing gardens.

Science News Letter, December 4, 1937

General Science

PAPERS OF THE MICHIGAN ACADEMY OF SCIENCE ARTS AND LETTERS. VOL. XXII—Eugene S. McCartney and Alfred H. Stockard, eds.—*Univ. of Michigan Press,* 717 p., illus., $4. A veritable storehouse of varied scientific wealth, ranging from uses of basswood fiber by Indians to the age of fish.

Science News Letter, December 4, 1937

Agriculture

SOIL SURVEY MANUAL—Charles E. Kellogg—*Govt. Print. Off.,* 136 p., illus., 35 c. An intensely practical pamphlet giving instructions for all necessary steps in making a soil survey, from the initial mapping to the collection and analysis of samples. With the soil at last recognized as a dominant factor in civilization, the development of adequate methods and personnel for soil surveys assumes ever-increasing importance.

Science News Letter, December 4, 1937

Anthropology

PREHISTORIC MAN (2d ed.)—Henry Field—*Field Museum,* 45 p., illus., 25 c.

Science News Letter, December 4, 1937

Technology

SYMPOSIUM ON WEAR OF METALS—*American Society for Testing Materials,* 105 p., illus., $1.25.

Science News Letter, December 4, 1937

Astronomy

EXPLORING THE HEAVENS—Clyde Fisher—*Crowell,* 223 p., illus., $2.50. The author is head of the Hayden Planetarium and curator of astronomy at the American Museum of Natural History; therefore should be well qualified to know the astronomical interests of the general public and the most effective popular presentation of facts about the heavens. The style is clear, direct, concise; the illustrations well chosen and photographically good.

Science News Letter, December 4, 1937

Physics

ATOMIC ARTILLERY—John K. Robertson—*Van Nostrand,* 177 p., $2.25. A short, yet comprehensive survey of why and how the twentieth century physicist is invading the interior of the atom. Designed primarily for the tyro in science, this volume requires no mathematical background to be understood.

Science News Letter, December 4, 1937

Statistics

STATISTICAL METHODS APPLIED TO EXPERIMENTS IN AGRICULTURE AND BIOLOGY—George W. Snedecor—*Collegiate Press,* 341 p., $3.75. A technical book for the agricultural economist dealing with statistics. The author is director of the Statistical Laboratory of Iowa State College and head of the Statistical Section of the Iowa Agricultural Experiment Station.

Science News Letter, December 4, 1937

Physiology—Philosophy

BIOLOGICAL TIME—P. Lecomte du Noüy—*Macmillan,* 180 p., $2. In this book, Lecomte de Noüy undertakes to introduce a new concept of time "which has a beginning and an end (and) does *not* seem to flow at a uniform rate. We will indicate the possibility of deriving from our own organism a unit of time different from the classical one derived from the rotation of the earth around its axis. We will also attempt to show the quantitative discrepancy between conceptual and physiological time."

Science News Letter, December 4, 1937

Agriculture

FARM CHEMURGIC JOURNAL. VOL. I, NO. 1, DEDICATED TO THE PROCEEDINGS OF THE THIRD DEARBORN CONFERENCE—*National Farm Chemurgic Council, Inc.,* 182 p., $1. A new journal, intended to be the official organ of the Farm Chemurgic movement. Contributions in the initial number consist of records of remarks and papers by the late Francis P. Garvan, Dr. Karl T. Compton, Dr. George W. Carver, Dr. William J. Hale, and others.

Science News Letter, December 4, 1937

Aviation

LAST FLIGHT—Amelia Earhart—*Harcourt, Brace,* 226 p., $2.50. The log of Amelia Earhart's last flight plus a reproduction of a short and simple note she had left with her publisher husband, George Palmer Putnam, in the event that any flight she made ended in disaster. The book was to have been titled "World Flight" if it ended the way Miss Earhart and her backers planned.

Science News Letter, December 4, 1937

Meteorology

THE FLOODS OF MARCH 1936. PART I: NEW ENGLAND RIVERS—Nathan C. Glover—*Govt. Print. Off.,* 466 p., illus., 70 c. This compilation of flood records will be invaluable to the engineer who must contend with high waters.

Science News Letter, December 4, 1937

Zoology, Juvenile

THE PET CLUB—Kathrine W. Masters—*Heath,* 223 p., 92 c. The story of how a group of children had fun and learned about animals at the same time by having pets in school and pets in the garden. Attractively illustrated.

Science News Letter, December 4, 1937

Zoology, Juvenile

SNIFF—James S. Tippett and Martha Kelly Tippett—*Heath,* 184 p., 80 c. The story of a puppy, in big type for small folks' eyes. Very interesting colored pictures.

Science News Letter, December 4, 1937

Zoology, Juvenile

WILD AMERICANS—Oren Arnold—*Albert Whitman,* 159 p., illus., $1.50. Adventure stories of young Americans with American wild animals, with much information painlessly administered in conversational form, and plenty of attractive photographic illustrations.

Science News Letter, December 4, 1937

Chemistry

THE DIFFUSION OF CERTAIN AMINO ACIDS IN AQUEOUS SOLUTION—John W. Mehl and Carl L. A. Schmidt—*Univ. of California Press,* 23 p., 25 c.

Science News Letter, December 4, 1937

Astronomy—Radio

SUNSPOTS AND THEIR EFFECTS—Harlan True Stetson—*Whittlesey House,* 201 p., $2. See page 360.

Science News Letter, December 4, 1937

Psychology

VISUAL GROUPING IN RELATION TO AGE—Grace Preyer Rush—*Archives of Psychology,* 94 p., $1.25.

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Bibliography

HANDBOOK OF SCIENTIFIC AND TECHNICAL SOCIETIES AND INSTITUTIONS OF THE UNITED STATES AND CANADA (3rd ed.)—Callie Hull, S. J. Cook and E. R. Berry, compilers—*National Research Council*, 283 p., $3 paper, $3.50 cloth. An extremely valuable reference book, again brought up to date. A necessity for libraries, it is useful also to schools, research workers and even offices. The index lists not only society names, but subjects, journals published and such things as fellowships and research funds available through institutions.

Science News Letter, December 4, 1937

Oceanography

THE MARION AND GENERAL GREENE EXPEDITIONS TO DAVIS STRAIT AND LABRADOR SEA . . . 1928, 1931, 1933, 1934, 1935: Scientific Results, Part 2—Edward H. Smith, Floyd M. Soule and Olav Mosby—*Govt. Print Off.*, 259 p., 75 c. Within the past decade the U. S. Coast Guard has conducted one of the world's most extensive and fruitful programs of oceanographic research in connection with its ice patrol and other duties. Physical oceanographic results are detailed in this volume.

Science News Letter, December 4, 1937

Photography

MINIATURE PHOTOGRAPHY FROM ONE AMATEUR TO ANOTHER—Richard L. Simon—*Simon and Schuster*, 168 p., illus., $1.75. Clear, practical, and readable is this handy reference book intended for the beginner in miniature photography.

Science News Letter, December 4, 1937

Photography

CREATIVE CAMERA ART—Max Thorek—*Fomo*, 156 p., illus., $3.75. A better title might be "Creative Darkroom Art." The author describes in detail the techniques that have won for him a distinguished place in photographic salons.

Science News Letter, December 4, 1937

Dendrology

A LEAF KEY TO FLORIDA BROAD-LEAVED TREES, NATIVE AND EXOTIC, EXCEPT PALMS—Mary Franklin Barrett—*Published by author, 57 Union Street, Montclair, New Jersey*, 79 p., ill., $1. Winter sojourners in Florida would like to know the names of the trees with which they are so richly surrounded, but even if they are competent botanists they are often still baffled, because the trees may not be offering any flowers by which they can be identified. This little book using leaves after the manner of the ancients but following modern methods, resolves the dilemma nicely.

Science News Letter, December 4, 1937

History of Science

THE HISTORY OF SCIENCE AND THE NEW HUMANISM (Rev. ed.)—George Sarton—*Harvard Univ.*, 196 p., $2. The scientific view of history and the historical view of science which Dr. Sarton practices and expounds is one of the intellectually significant movements of the age.

Science News Letter, December 4, 1937

Geology—Biology

THE GEOLOGY AND BIOLOGY OF THE SAN CARLOS MOUNTAINS, TAMAULIPAS, MEXICO—Directed by Lewis Burnett Kellum—*Univ. of Michigan Press*, 341 p., illus., maps, $5. As one of the first detailed studies of the eastern part of Mexico, this study will serve as a nucleus around which other detailed studies can be correlated.

Science News Letter, December 4, 1937

Volcanology

MOUNT ST. HELENS: A RECENT CASCADE VOLCANO—Jean Verhoogen—*Univ. Calif. Press*, 29 p., illus., 65 c. Detailed technical description of a volcano in the Cascade Mountains that may have erupted as recently as 1854.

Science News Letter, December 4, 1937

Economics

ELEMENTS OF MODERN ECONOMICS—Albert L. Meyers—*Prentice-Hall*, 363 p., $4. A beginning text conforming to recent developments in economic and monetary theory.

Science News Letter, December 4, 1937

Psychology

DYNAMICS IN BINOCULAR DEPTH PERCEPTION—Heinz Werner—*Psychological Review Co.*, 127 p., $2. The report of experiments performed at the psychological laboratory of the University of Michigan.

Science News Letter, December 4, 1937

Psychology

MEMORY TRACE FOR FIGURES IN RECALL AND RECOGNITION—Nelson Gilbert Hanawalt—*Archives of Psychology*, 89 p., $1.25.

Science News Letter, December 4, 1937

Child Psychology

STUDIES IN EMOTIONAL ADJUSTMENT—Hyman Brandt, Harold M. Williams, and Harold S. Carlson—*Univ. of Iowa*, 102 p., $1 paper, $1.35 cloth.

Science News Letter, December 4, 1937

Agriculture—History

SEED FROM MADAGASCAR—Duncan Clinch Heyward—*Univ. of North Carolina Press*, 256 p., illus., $3.50. A former governor of South Carolina talks about old days in the Carolina Low Country, where his great-grandfather owned and managed seventeen plantations. Ante-bellum rice planting (which was a combination of engineering and agriculture), and reminiscences and traditions of interesting persons both white and black, are mingled with shrewd comment on social and economic changes.

Science News Letter, December 4, 1937

Science

ASPECTS OF SCIENCE—Tobias Dantzig—*Macmillan*, 285 p., $3. "This book is an essay on faith. Not the faith which grew out of weariness and fear of oblivion, and which projected life beyond life, but faith in the reign of reason, which was to conquer fear and lead the triumphant march of man towards a more abundant life." A mathematician looks upon history and science, past and present, with a philosophical eye.

Science News Letter, December 4, 1937

Research

SCIENTIFIC METHOD: ITS PHILOSOPHICAL BASIS AND ITS MODES OF APPLICATION—F. W. Westaway—*Hillman-Curl*, 588 p., $3.75. Encyclopedic treatment of the methodical procedure of scientific investigation, with stress upon its philosophy and logic. Famous scientists of the past and today and their work are quoted extensively.

Science News Letter, December 4, 1937

Child Psychology

RHYTHMIC RESPONSES OF NEGRO AND WHITE CHILDREN TWO TO SIX, WITH A SPECIAL FOCUS ON REGULATED AND FREE RHYTHM SITUATIONS—Dorothy Van Alstyne and Emily Osborne—*Society for Research in Child Development National Research Council*, 63 p., 75 c. Little Negro children are about 50 per cent better than the Whites in learning rhythms, it was found.

Science News Letter, December 4, 1937

Technology

A. S. T. M. STANDARDS ON TEXTILE MATERIALS—*American Society for Testing Materials*, 306 p., illus., $2.

Science News Letter, December 4, 1937

Zoology

THE OXYSTOMATOUS AND ALLIED CRABS OF AMERICA—Mary J. Rathbun—*Govt. Print. Off.*, 278 p., illus., 60 c.

Science News Letter, December 4, 1937